

## Games that teach

Teachers spend a great deal of time trying to capture student interest because motivation is the beginning of learning. One effective way to do this is through the use of games in the classroom. Games provide a natural motivation, are part of good teaching strategies, and, fortunately, there are many that can be used to help build concepts. Although games should not be used as a substitute for hands-on investigations, especially inquiry lessons, there are many situations where games can be useful in teaching. For example, they can be used to introduce various presentation formats, improve comprehension through simulations, or review the concepts in a format that is interesting to students. Here are some general ideas for incorporating various types of games into your lesson plans.

### Simulations

Simulations can include a variety of activities, such as role-playing or modeling a concept. For example, some problems related to pollution are too complex for younger students to investigate in a research format, so an alternate presentation form is to provide a simulation activity with students taking on various roles and discussing the environmental problem. Students can be members of a town in which the city dump is becoming too full and a solution must be found for waste disposal. They could be assigned specific roles as town members, and then conduct research to gather information. Once the needed information is collected, students run through the scenario, discussing the pros and cons of certain alternatives.

Another good simulation activity comes from a game called The Incredible Journey, which was originally developed by Project WET and is available online at no cost (see Resources). In this game, students become water droplets



and follow the course of their “life” through various stations and phases set up around the room. The game emphasizes the fact that the water cycle is not a single cycle, but consists of complex multiple paths. There is very little setup involved and students can keep a record of their pathways for discussion at the end of the activity.

Many other simulation games are available for teaching environmental science and for other science topics. Of course, with a little creativity, you can design your own simulation game to match your science curriculum.

### Board games and paper-and-pencil games

There are some board games that can be purchased which incorporate science concepts (see Resources); however, students can have even more fun (and learn more!) if they create the game themselves. Adaptations for science lessons are easy to do for word searches, crossword puzzles, other paper-and-pencil games (such as hangman), and many standard board games. For example, for the game of bingo, minerals and/or rocks could be used to represent the letters, and various characteristics of those minerals can represent the numbers on the bingo card. The cards can then be filled by making direct matches with the squares called, or the match can be more obscure so students have to remember the material in order to fill in the blocks.

A common paper-and-pencil game to adapt and employ is one that I call categories. Categories is set up with a

chosen word (providing the letters for the category) and then a category is also chosen. More points are awarded if the participant thinks of something appropriate in the category that no one else thinks of, but

**FIGURE 1** Sample categories game board

	S	T	U	D	Y
<b>Flowers</b>	Snowdrop, sunflower, stargazer	Thistle, tulip		Daisy, day lily, daffodil, dahlia	Yew
<b>Trees</b>	Sugar maple, silver maple	Tower poplar		Dogwood, Douglas fir	
<b>Mammals</b>	Sheep			Dog	
<b>Birds</b>	Sparrow, swallow, snowy egret		Upland sandpiper	Dove	

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a point is always given to a correct answer, even if others have the same answer. When this game is played just for fun, categories such as cars, flowers, and so on are used. In the science version, natural topics such as trees or insects could also be used if they are being studied, but any science topic can be used as long as multiple answers are possible. Just try out the ideas yourself to make sure that they work (see Figure 1 for a sample game board).

### Active games

Active games can copy a standard game or can be created for the specific situation. Hooks and Ladders is a game created by the Western Regional Environmental Education Council to teach students about the migration of salmon (see Resources). Habitat Lap Sit has students represent food, water, shelter, and space while sitting down in a circle. Then statements are made, such as “this year is a drought,” and students who represent water must remove themselves. The impact on the circle becomes clear, reflecting the impact on a habitat. Likewise, games of tag can have a new twist by applying labels to the participants in the games. For example, one group could represent the essentials needed for survival (food, shelter, and water) while participants on the other side represent animals. If the animal is not able to tag all of the essentials, the animal is out. Another game that is fun for students is basically musical chairs, with the chairs, representing different habitats that are eliminated as the game goes on.

### Contests

Often, by adding the element of a competition to a game, student motivation is increased. One example is to have students build a craft out of simple materials (e.g., straws, aluminum foil, waxed paper, and transparent adhesive tape) and see which craft will hold the most weight before sinking in a tub of water. (See “Float It Down the River” in the October 2000 issue of *Science Scope*.)

The Metric Olympics, by AIMS Education Foundation, is a contest in the sense that it simulates Olympic competition with four activities: Paper Straw Javelin Throw, Paper Plate Discus, Cotton Ball Shot Put, and Right-Handed Marble Grab (see Resources). Each time a javelin is tossed, a discus is thrown, a shot is put, or marbles are grabbed, students must first estimate how well they did (using metric unit) before they use a meter stick or balance to measure their performance. For example, after Jim tosses the javelin, he must first estimate how far it traveled, say 6 meters, before using a meter stick to determine that it ac-

tually traveled 7.2 meters. Students work as a group so they can obtain several records and calculate averages. Incidentally, for safety reason, I recommend substituting beans for marbles when doing the Marble Grab. If the marbles get on the floor, a student could slip. The beans cause less trouble and work equally well for establishing the concept. In this activity, the contest element is also highlighted by awarding “medals” to the winners. However, the activity is fun even without the contest.

In addition to the contest games mentioned, many other activities can have the contest element added for the sake of motivation. For example, brochures and posters, prepared in a science unit as part of a learning project, can be judged as part of a contest.

### Card games

Like board games, card games can be made with scientific themes. Go Fish, or any other matching card game, can be made with sets of science-related cards. The matching can be obvious for younger students, or one in which an older student needs to make a correct association. Most of these games could be prepared by the students (or by the teacher); they may enjoy preparing the cards, and even learn concepts while doing so.

### Reviewing

Review can easily be made into a game to keep the attention of the students. There are many reasonable formats for this, including current game show adaptations, simulated ball games, crossword puzzles, and other creative adaptations of existing games.

### Final card

Creative thinking on your part and on the part of your students can produce a large number of additional games that can be used as activities in the science classroom. Additionally, a number of games can be created or adapted using standard activity resource books, books on games, student texts, and texts for teaching science.

### Resources

The Incredible Journey, by Project WET—[www.projectwet.org/resourcedetail.asp?ID=1](http://www.projectwet.org/resourcedetail.asp?ID=1)

Educational Learning Games—[www.educationallearninggames.com/science-nature-games-1.asp](http://www.educationallearninggames.com/science-nature-games-1.asp)

Hooks and Ladders, by the Western Regional Environmental Education Council—[www.fish.washington.edu/sic/resources/hooks\\_ladders.html](http://www.fish.washington.edu/sic/resources/hooks_ladders.html)

Metric Olympics, by AIMS Education Foundation—[www.bgcs.k12.oh.us/reinhart/metricolympics.pdf](http://www.bgcs.k12.oh.us/reinhart/metricolympics.pdf)